

## REDUCING HARMFUL DIESEL EMISSIONS: WHAT SCHOOLS CAN TEACH BUSINESS

Besides being unsightly, the black plume from a diesel exhaust can be hazardous to human health. Diesel exhaust contains at least 450 components, and at least 40 of those are toxic air pollutants. Among the most toxic elements of diesel exhaust are Particulate Matter, carbon monoxide, and aromatic emissions.

*Particulate Matter (PM)* is made up of solid particles, soot, or dust. In diesel exhaust, particulate matter is mostly black carbon and is the visible plume of diesel exhaust. PM 2.5 causes the most concern. PM 2.5 that are 2.5 microns or less in diameter. (For comparison purposes, these are about half the diameter of a human hair.) These particles enter and remain in the lungs, causing many breathing and health problems. They can aggravate asthma.

*Carbon monoxide*—an odorless, tasteless, invisible gas—is a deadly compound released by combustion.

*“Aromatic emissions”* or “aromatics” are carbon-based and can be toxic.

The serious health risks posed by diesel exhaust prompted the Lincoln Public School (LPS) system to retrofit school buses with emission control systems. These same actions can be taken by any business or industry with a diesel fleet.

### THE PROJECT

LPS received a grant from the United States Environmental Protection Agency (EPA) in its “Clean



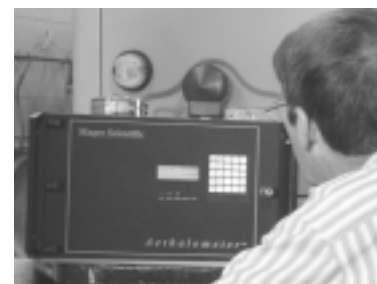
School Bus USA” program <<http://www.epa.gov/cleanschoolbus/index.htm>>. This grant enabled LPS to test diesel emissions and purchase catalytic converters. LPS

retrofit 101 school buses with AZ Purimufflers. (The other ten buses in the fleet already had catalyst mufflers.) These catalyst mufflers are manufactured by Lubrizol Engine Control Systems <<http://www.epa.gov/otaq/retrofit/techlist-ecs.htm>>. The units cost \$960 each (the price includes parts and labor).

### BENCHMARK TESTS

LPS worked with the Lincoln-Lancaster County Health Department (LLCHD) to monitor diesel emissions on school buses. The buses were tested both before and after the installation of the control technology. These were some of the first tests of this nature conducted in the country using an Aethelometer. The Aethelometer measures black carbon particles.

LLCHD staff sampled diesel emissions from four school buses. Staff conducted tests both in the maintenance garage and in the bus while



*Changes to the Universal Waste Code:  
see page 2.*

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*Please circulate this issue among your staff and coworkers.*

# NEW EPA RULE CLASSIFIES MERCURY-CONTAINING EQUIPMENT AS UNIVERSAL WASTE

USEPA

The EPA is adding mercury-containing equipment to the universal waste rule (see related article, below).

The universal waste rule provides streamlined management requirements tailored to several different kinds of waste. The types of waste governed by the universal waste rule are frequently thrown in the trash by unregulated households and small businesses. Classifying an item as a universal waste provides flexibility for its proper management and can prevent the item from entering municipal trash. Instead, it can be readily collected and disposed of at a hazardous waste facility.

Handlers of this new category of universal waste must prevent mercury releases by using specific containers that will not release any mercury. Final disposal and recycling requirements remain the same as for other federally regulated hazardous waste.

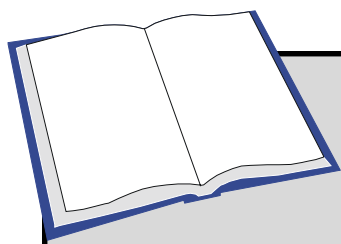


Mercury-containing equipment includes devices, items, or articles that contain varying amounts of elemental mercury, including several types of instruments that are used throughout electric utilities and other industries, municipalities, and households. Some commonly recognized devices are thermostats, barometers, manometers, temperature and pressure gauges, and mercury switches, such as light switches in automobiles. Other items currently classified as universal waste are batteries, thermostats, pesticides, and lamps.

For more information, visit:

<<http://www.epa.gov/epaoswer/osw/hazwaste.htm#recycle>>

<<http://www.epa.gov/epaoswer/hazwaste/recycle/electron/crt.htm>>



## UNIVERSAL WASTE RULE (40 CFR PART 273)

BETH MANN, CHMM  
ENVIRONMENTAL HEALTH SPECIALIST II

The universal waste regulations streamline collection requirements for certain hazardous wastes in the following categories: batteries, pesticides, mercury-containing thermostats and lamps, and mercury-containing equipment. This rule encourages the proper recycling or treatment of the above wastes. It also makes it easier for companies to collect and store waste in a safe manner prior to recycling.

The rule extends the amount of time that businesses can accumulate these materials on site.

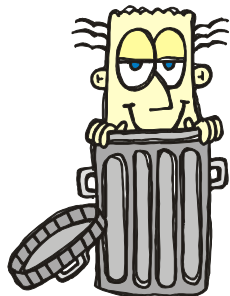
It also allows companies to transport them with a common carrier, instead of with a hazardous waste transporter. Companies do not need to obtain a manifest for universal wastes.

The purpose of the rule is to:

- ◆ ease regulatory burdens on businesses;
- ◆ promote proper recycling, treatment, or disposal; and
- ◆ provide collection opportunities.

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# TRASH TO TREASURE



Keep Nebraska Beautiful (KNB) <<http://www.knb.org/>> helps businesses, communities, and individuals keep their environments livable and attractive. KNB sponsors the Materials Exchange to help organizations and businesses get rid of items they do not need and find items they do need.

Through the publication of *The Link*, KNB promotes the reuse of materials and the concept that one

person's trash is another person's treasure. Items listed in *The Link* can include wood pallets, shelving, small engines, slide projectors, chromium hydroxide, and computers. A few years ago, KNB helped find someone who needed turkey feathers.

Listings in *The Link* are free and can be confidential. For more information, visit the KNB Link web page <<http://www.knb.org/pdf/link/Link%20Summer%2005.pdf>>.



## NEW SUBSTITUTION GUIDES

PETER JOHNSEN,  
NEVADA SMALL BUSINESS DEVELOPMENT CENTER



I am pleased to announce a new series of reports produced by the Institute for Research and Technical Assistance (IRTA) funded by a USEPA Pollution Prevention Grant, NP-97937301-0, and Cal/EPA's Department of Toxic Substances Control.

- ☑ Safer Adhesive and Cleanup Alternatives for Countertop Manufacturing, (August 2004)
- ☑ Alternative Low-VOC, Low Toxicity Cleanup Solvents for the Lithographic Printing Industry, (November 2004)
- ☑ Alternative Low-VOC, Low Toxicity Cleanup Solvents for the Screen Printing Industry, (April 2005)

These reports are available at <<http://www.wrppn.org/irta>>. If navigating from the WRPPN home page, click the "Studies" tab and navigate to the link.

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## UNIVERSAL (CONTINUED FROM PAGE 2)

### UNIVERSAL WASTE CATEGORIES

A waste must be a *hazardous* waste before it can be considered a *universal* waste. A waste must also meet certain criteria to qualify as a universal waste. For instance, it must be widespread, commonly found in medium to large volumes, and exhibit only low-level hazards or be easily managed

### AFFECTED BUSINESSES

All businesses (large or small) that generate any amount of any hazardous waste listed in the universal waste categories (batteries, pesticides, mercury-containing thermostats and lamps, and mercury-containing equipment) are subject to the Universal Waste Rule.

For more information call Beth Mann at (402) 441-6235 or visit <<http://www.epa.gov/epaoswer/hazwaste/id/univwast.htm>>



## DIESEL EXHAUST (CONTINUED FROM PAGE 2)



carrying students. The sensor is placed near the exhaust pipe for the in-garage tests. The unit was placed on the bus for the driving tests.

Additional air readings were taken at schools when buses dropped children off for class. The Aetholometer was placed near the school door. Readings in these tests were minimal. (In part, the low readings were due to LPS's policy requiring drivers not to let the bus engines idle for more than three minutes.)

The LLCHD staff also tested for carbon monoxide.



## RESULTS

After the installation of the AZ Purimufflers, the four school buses were tested again, using the same method used in the benchmark tests.

In the garage and in the bus, PM 2.5 emissions remained relatively unchanged. (The purimuffler is not designed to control particulate emissions; however, the company that makes the purimuffler also makes a purifier, which is designed to control particulate matter.) Aromatic emissions were reduced by about 23%, and CO emissions were reduced by about 46%.

The results at the pickup and drop-off zones were more impressive. At the door, there was a 45% reduction in PM 2.5 and a 49% reduction in aromatics.

Other school districts that have installed the same control devices have seen similar results. Studies and results can be viewed at <http://www.lubrizol.com/EngineControl/news/FairfaxSchool.asp>.

## IMPLICATIONS

Any business that has a fleet of diesel vehicles could benefit from installing emission control technologies. These emission systems protect the health of drivers and other employees. Businesses can reduce health risks and create a positive public image. Emission control technology is not just for school buses.

For more information about the LPS project, contact Bill McCoy at (402) 436-1073.

For more information about the tests and test equipment, contact Gary Bergstrom at (402) 441-6202.



## POLLUTION PREVENTION

### THE ENVIRONMENTAL ETHIC OF LANCASTER COUNTY

*The Ethic* is published by the Lincoln-Lancaster County Health Department and is distributed to Special Waste Permit holders and other businesses in Lincoln and Lancaster County.

**For more information or P2 technical assistance, call 441-8040.**

Back issues of *The ETHIC* and other information are available on our website:

<http://www.lincoln.ne.gov/city/health/envIRON/pollu/>

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